



**US Army Corps
of Engineers®**



**Creation Of Intertidal
Habitat for Shellfish In
Rumney Marsh
(Revere & Saugus,
Massachusetts.)**

ACKNOWLEDGEMENTS

USACE – New England District
Commonwealth of Massachusetts
- DMF, DEP, EOEA

USEPA

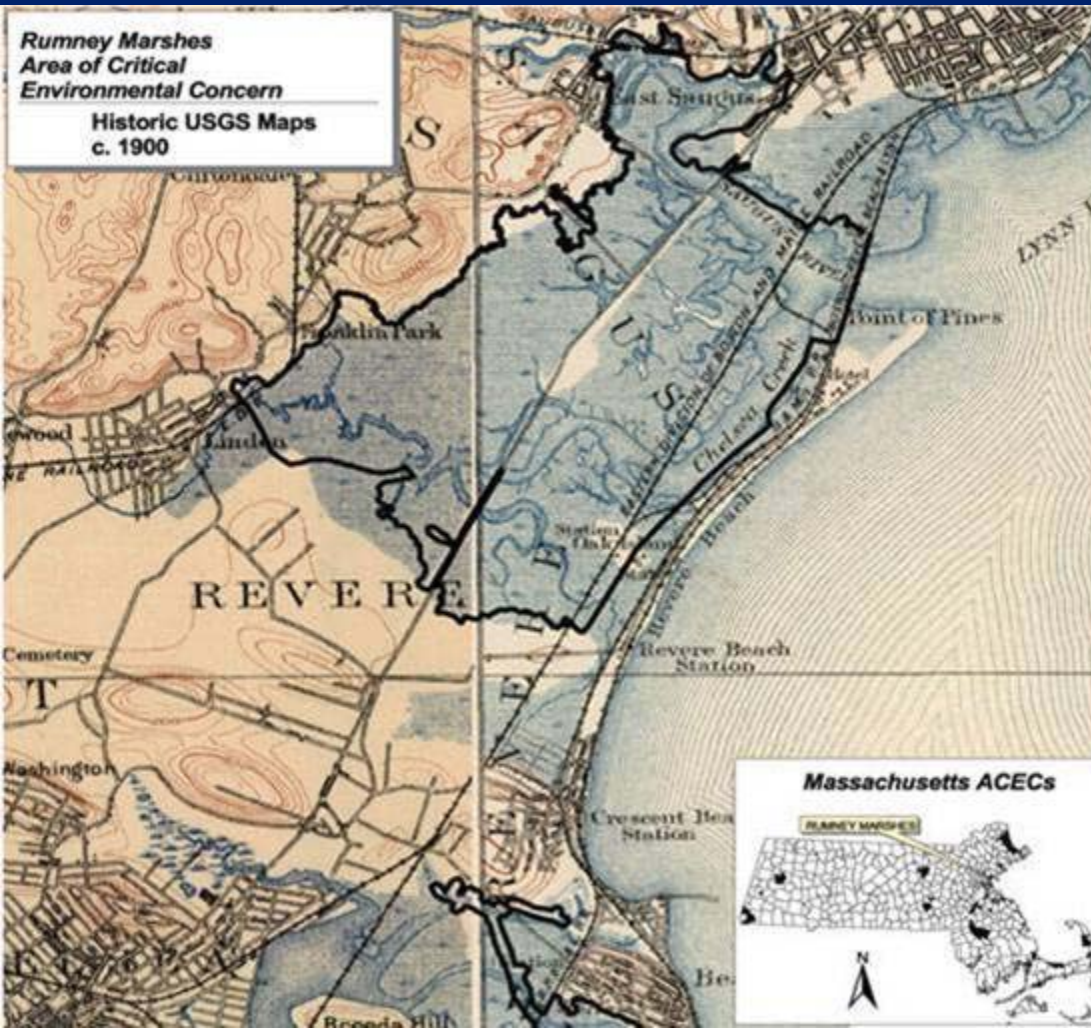
NMFS

OVERVIEW

- **ECOSYSTEM SETTING**
- **TWO MITIGATION PROJECTS**
 - **NEED FOR MITIGATION**
 - **MONITORING EFFORTS**
 - **FINDINGS**

RUMNEY MARSH

1900



1985



Rumney Marshes ACEC, Existing vs. Historic Wetlands



1967



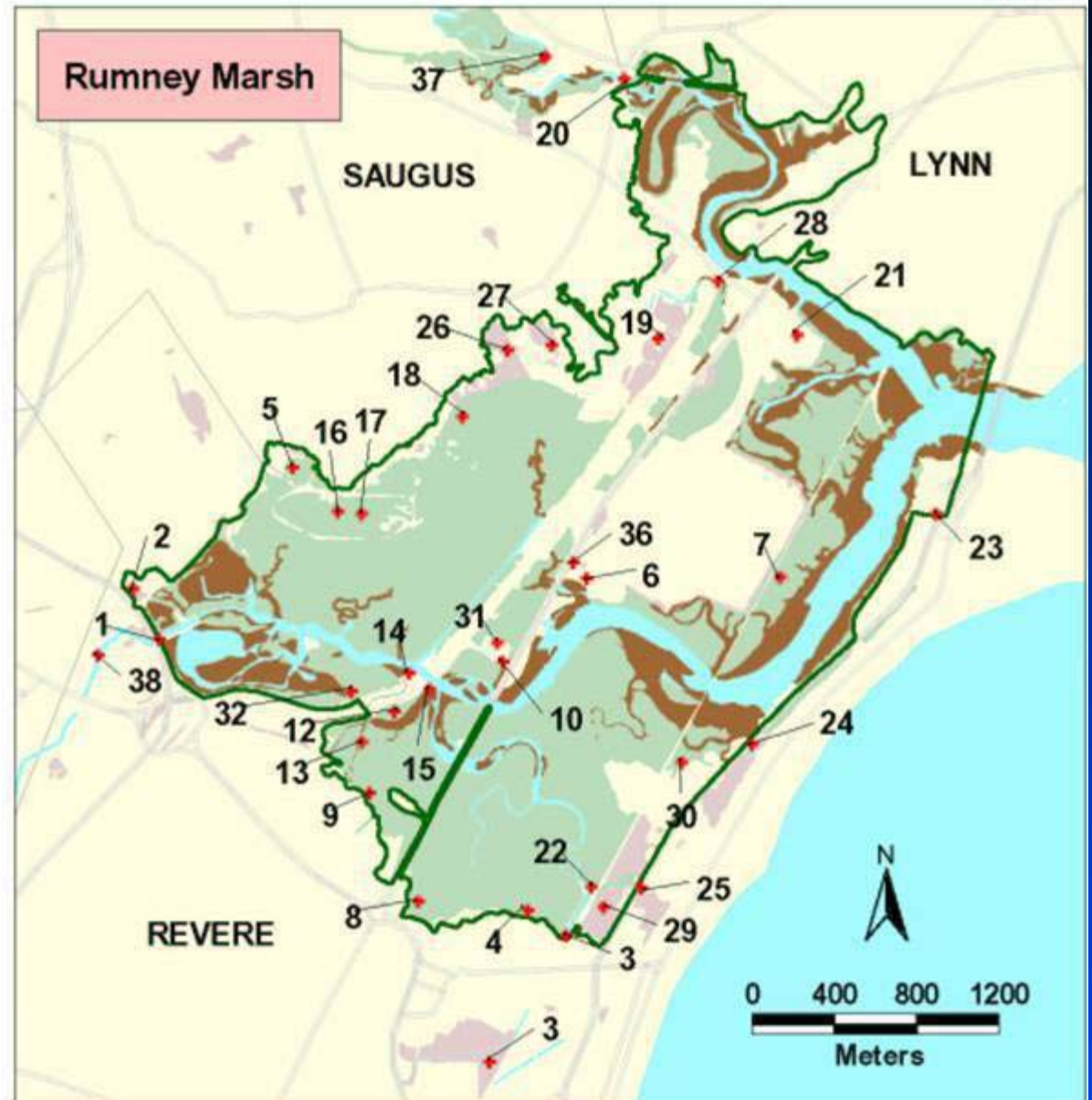
1972



HIGHWAY EMBANKMENT 1990

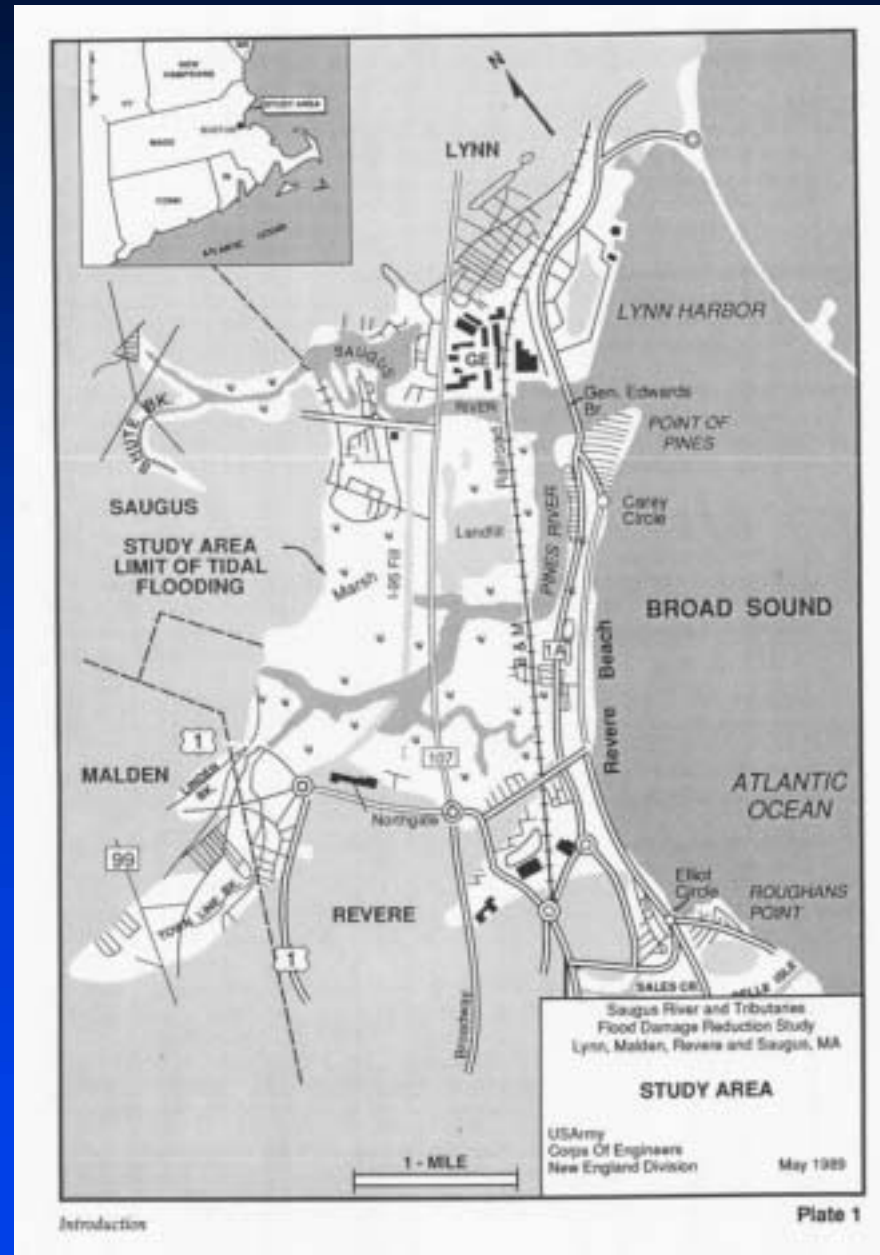


Restoration Planning



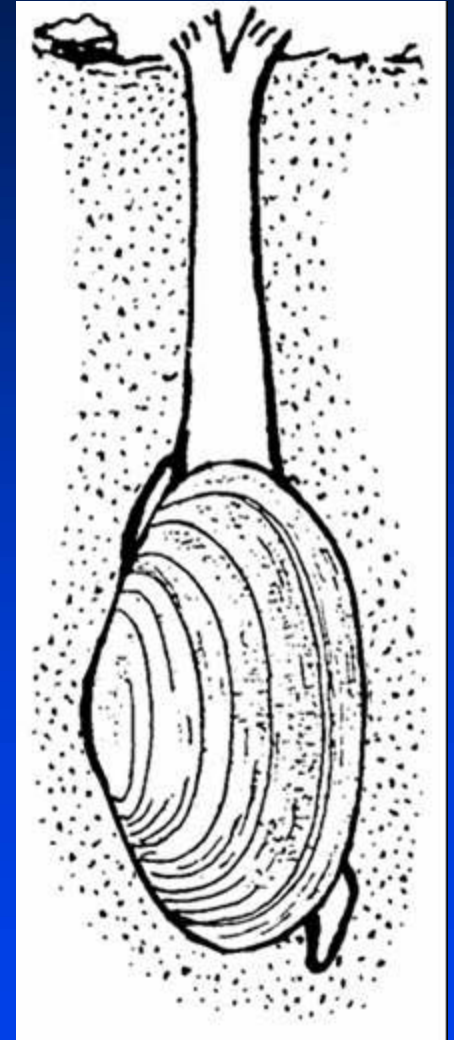
ROUGHANS POINT PROJECT

- Series of dikes and seawalls placed along coastal areas for flood protection
- Loss of approximately 3 acres of intertidal flat



ROUGHANS POINT MITIGATION SITE

- To create elevations subject to intermittent tidal flooding at the project area
- To create substrate composition within the project area to levels of comparable surrounding habitats
- To establish self-sustaining soft-shell clam (*Mya arenaria*) populations to the newly created site



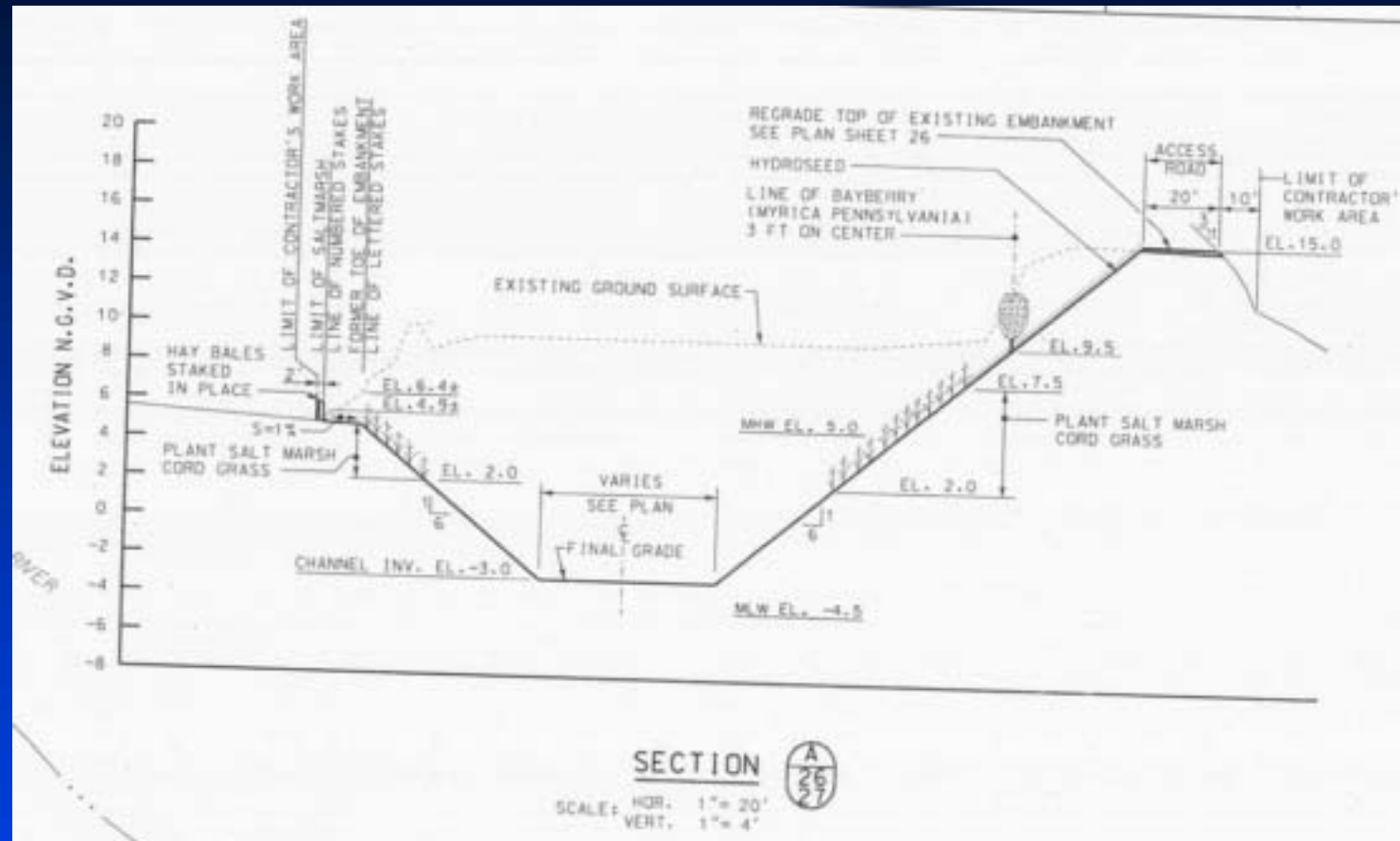
HIGHWAY EMBANKMENT 1990





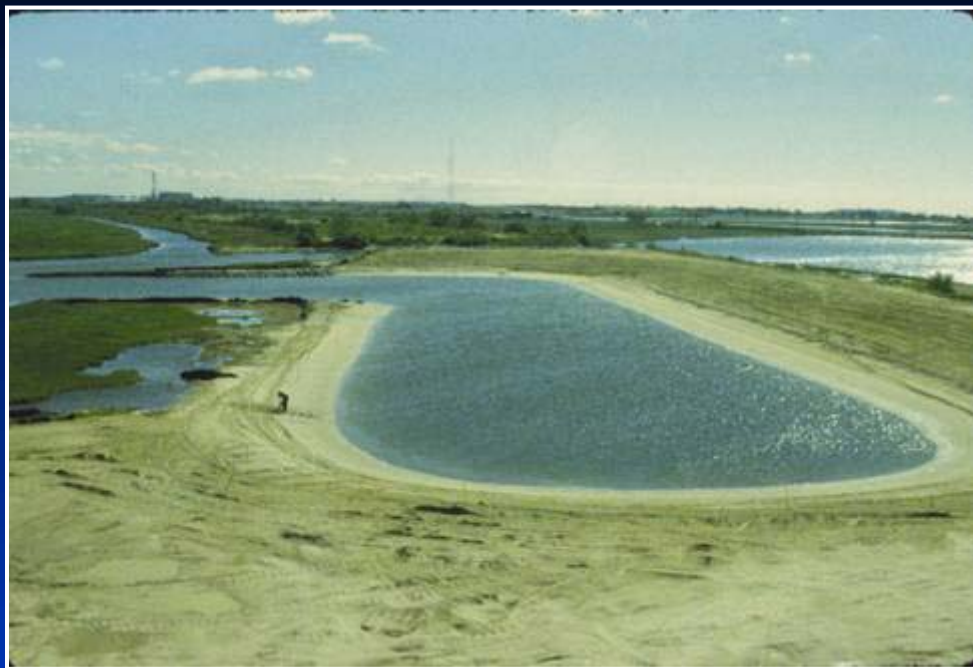
**Created
Intertidal
Flat**

PLANS AND SPECIFICATIONS



- Sides slopes : 1 vertical : 6 horizontal
- Upper edge of area: graded on a one percent slope

- **Cobbles and boulders > 6 inches removed**
- **Intertidal flat constructed at an elevation of -3 ft NGVD**



ROUGHANS POINT MITIGATION AREA



ROUGHANS POINT MITIGATION SITE

SEEDING

- ~ 30,000 hatchery-raised juvenile (8-15 mm) soft-shell clams (*Mya arenaria*)
- Three 3 m x 6 m plots within the lower intertidal zone
- Seeding on June 17, 1999
- A 6 mm mesh netting was placed over the seeded plots for a period of ~7 months



MONITORING



- **3 Areas**
 - **Seeded**
 - **Unseeded**
 - **Reference**

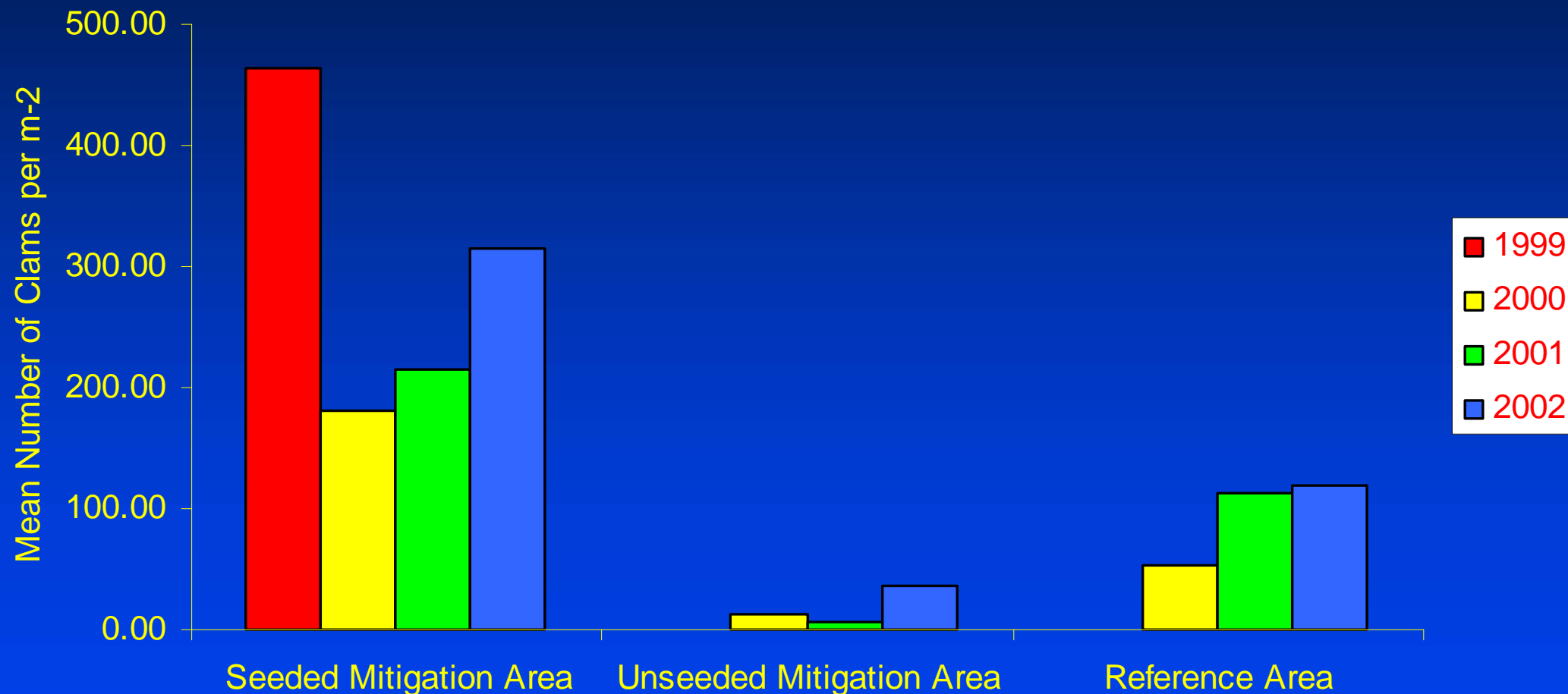
- **Monitoring Efforts**
 - **September 1-2, 1999**
 - **October 19-20, 2000**
 - **September 11-12, 2001**
 - **September 17-18, 2002**

MONITORING

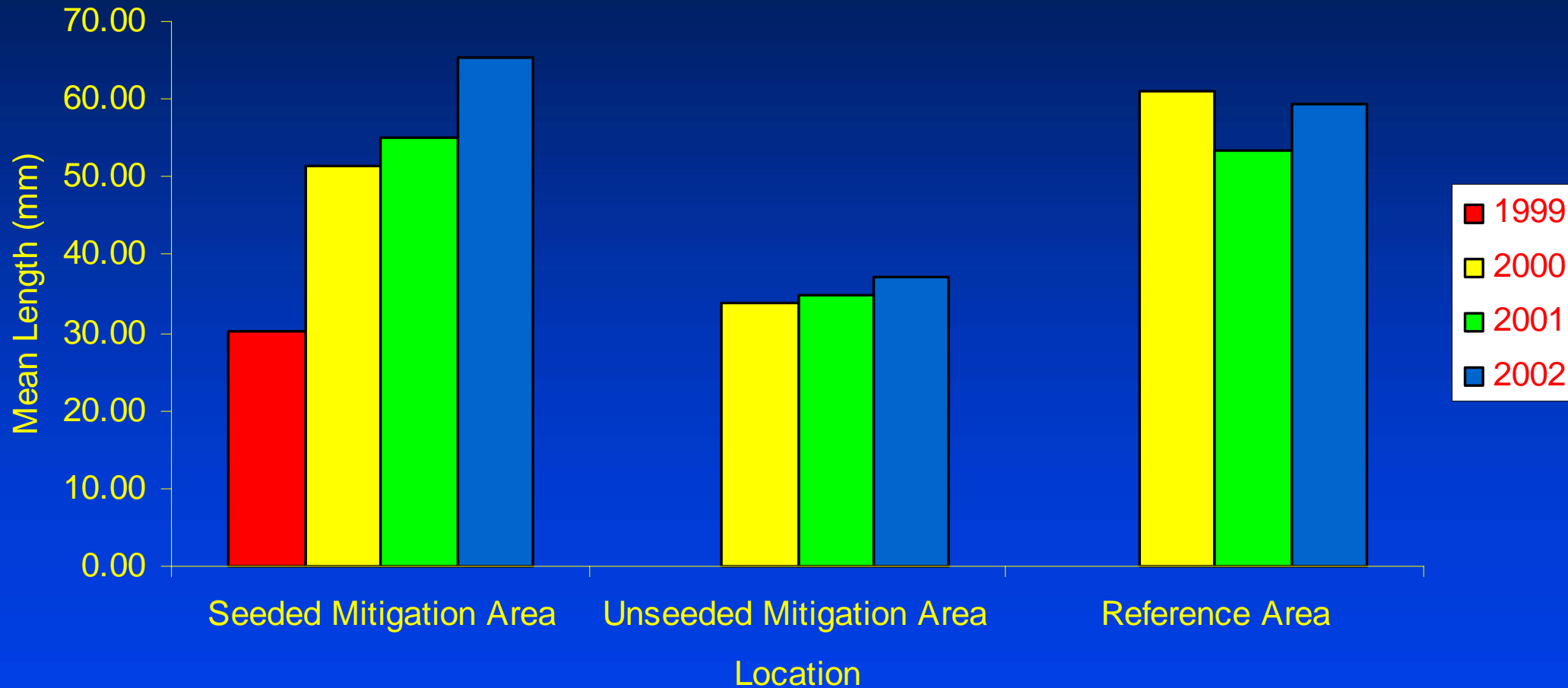


- **5 randomly selected plots within each area**
- **0.09 m² (1 ft²) quadrat was excavated to a depth of 60 cm (2 ft)**
- **Material passed through a 6 mm sieve**
- **All live shellfish retained: identified, counted, measured and weighed**

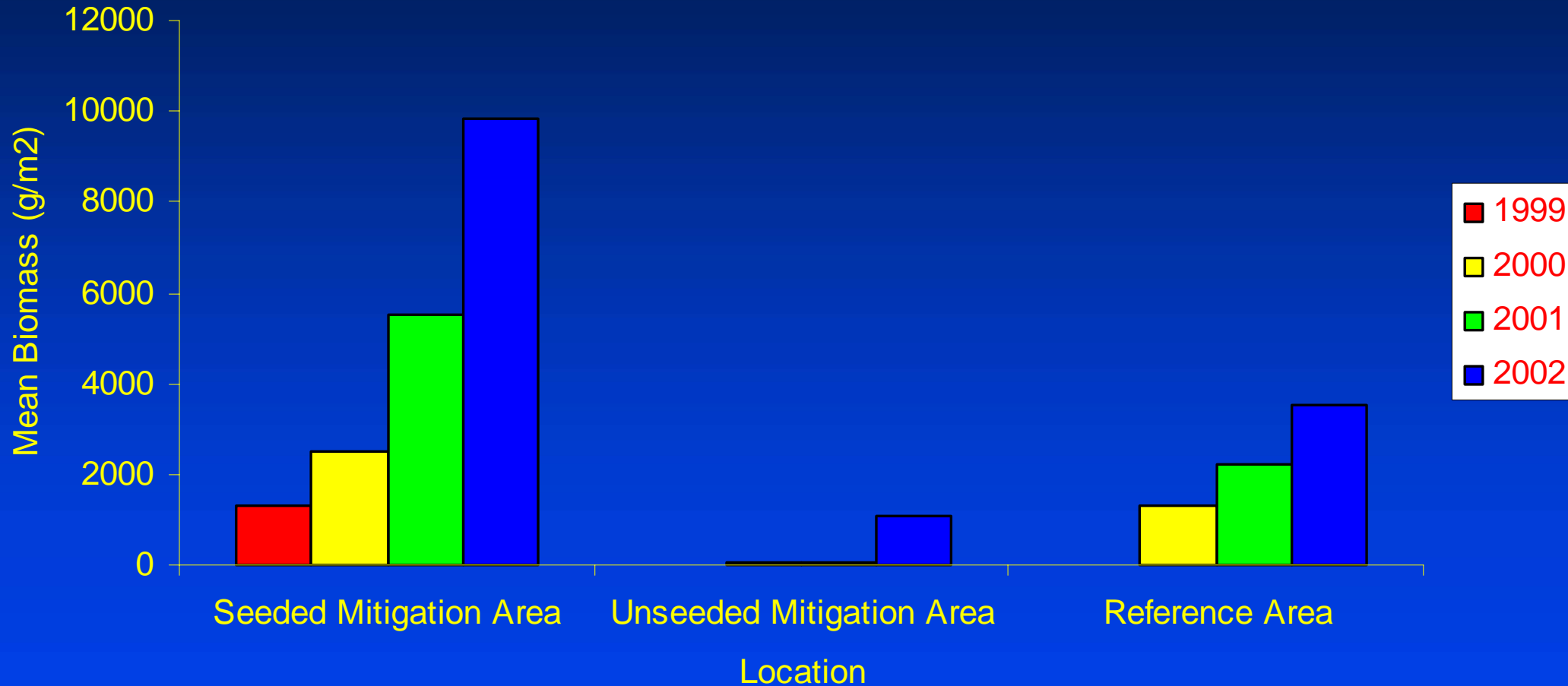
Density of Soft-shelled Clams at Roughan's Point Mitigation Area



Mean Length of Soft-shell Clams at Roughans Point Mitigation Area



Mean Biomass of Soft-shell Clams at Roughan's Point Mitigation Area

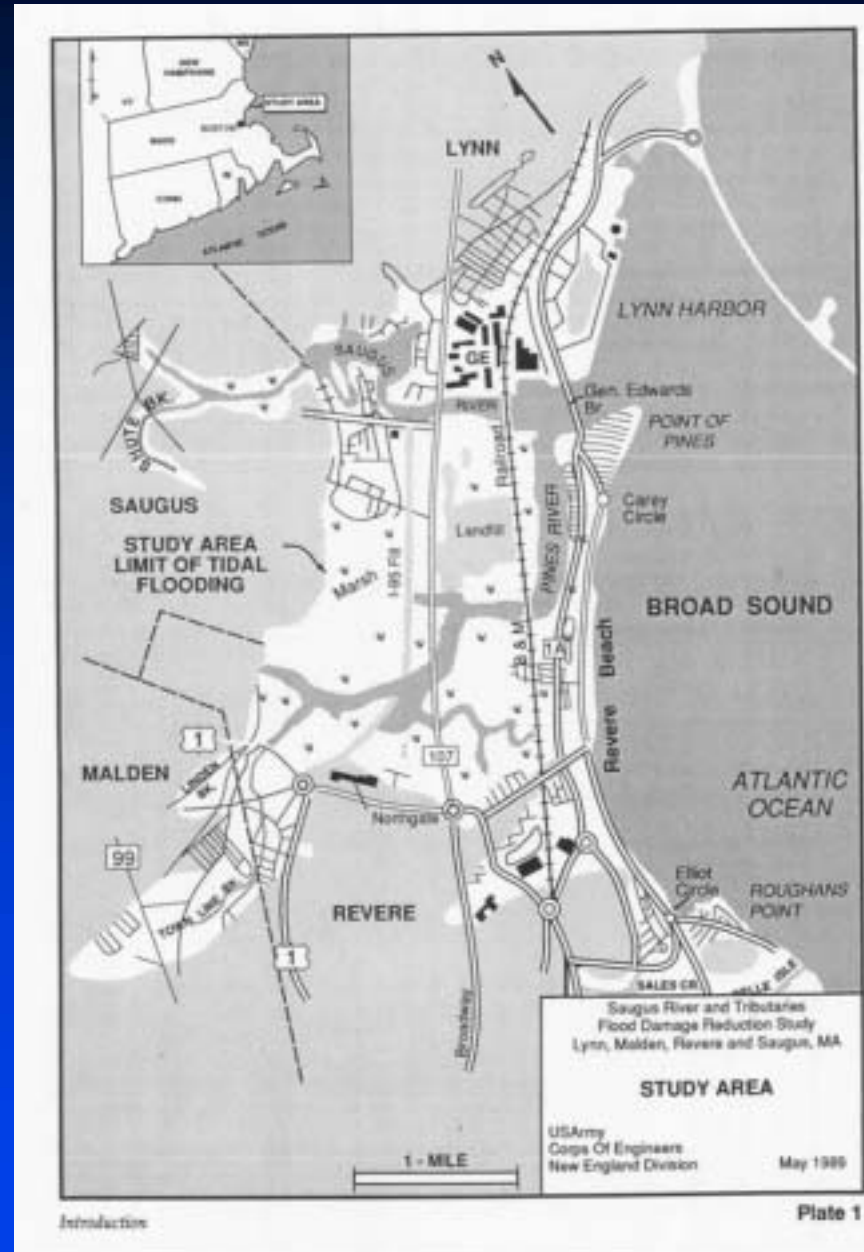


ROUGHAN'S POINT MITIGATION SITE SUMMARY



- Increase in length and weight of *Mya* in the seeded areas
- New recruitment into the seeded and unseeded areas

SAUGUS RIVER PROJECT



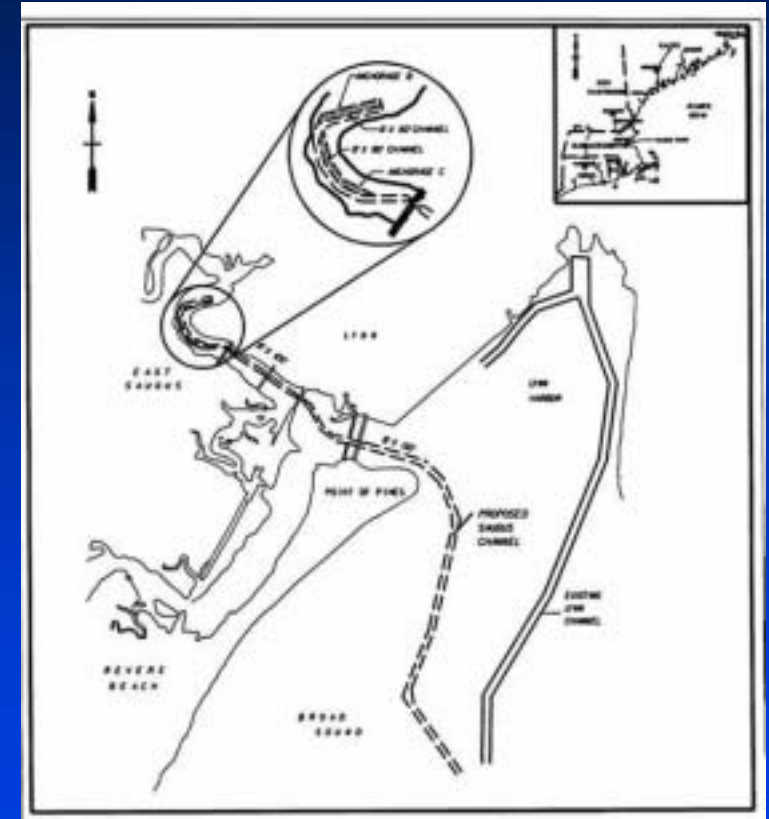
SAUGUS RIVER NAVIGATION IMPROVEMENT PROJECT

NAVIGATION NEEDS

- Deeper Channel
- Larger Anchorage Area

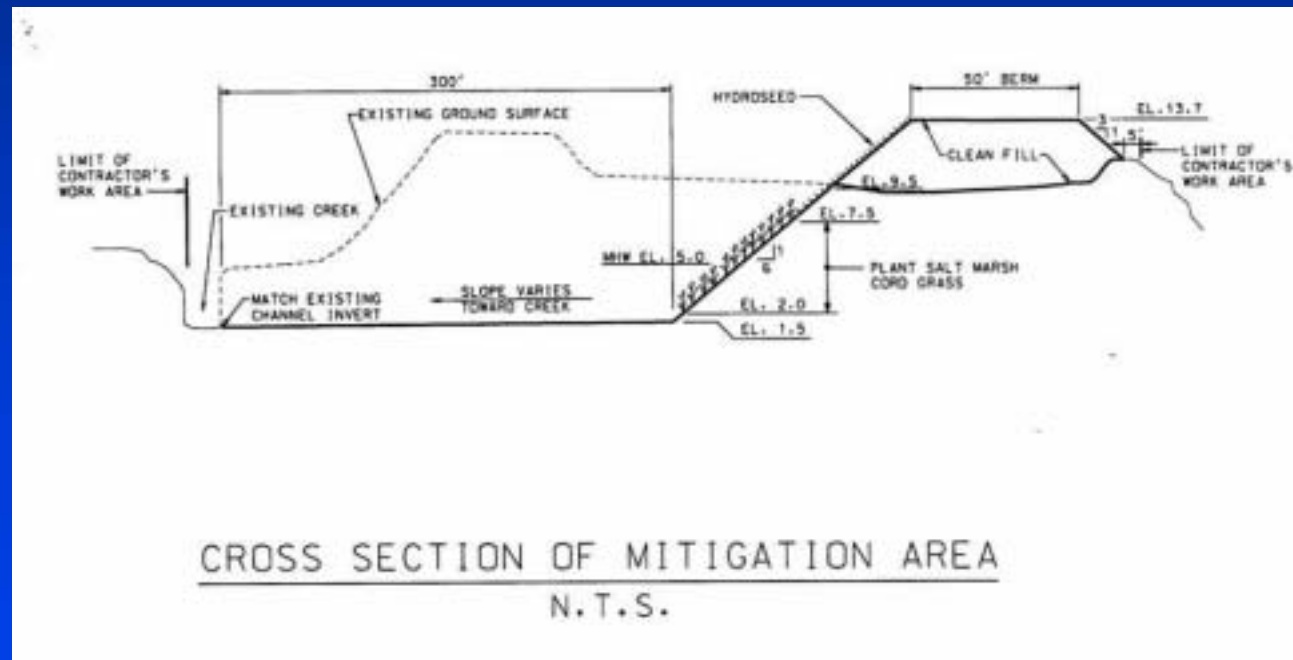
ENVIRONMENTAL IMPACTS

- Loss of 3 acres of intertidal mud flat
- Disturbance of 30 acres of subtidal habitat



MITIGATION FOR SAUGUS RIVER NAVIGATION IMPROVEMENT

- Creation of 4.3 acres of intertidal flat
- Creation of 1 acre of *Spartina* marsh



SAUGUS RIVER MITIGATION SITE



SAUGUS RIVER MITIGATION SITE

SAMPLE LOCATIONS



BENTHIC COMMUNITY ANALYSIS, VEGETATION MONITORING, AND SHELLFISH MONITORING



SAUGUS RIVER MITIGATION AREA

BENTHIC RESULTS

	2001	2002
High Intertidal	-LD (2) -Oligochaetes	-LD (3) -Oligochaetes
Mid Intertidal	-MD (7) -Capitellid/Spionid	-MD (6) -Spionid/Nereid
Low Intertidal	-MD (10) -Capitellid/Spionid	-MD (7) -Capitellid/Nereid

SAUGUS RIVER MITIGATION AREA

SHELLFISH RESULTS

2001

Tran.	Mid	Low
1	<i>Macoma</i>	<i>Macoma</i>
2	-	<i>Macoma</i>
3	-	-
4	-	<i>Macoma</i>
5	-	-

2002

Tran.	Mid	Low
1	-	<i>Macoma</i>
2	-	-
3	<i>Macoma</i>	<i>Macoma</i>
4	-	<i>Macoma</i>
5	<i>Mya</i> (26.5 mm)	<i>Mya</i> (51 mm)

SAMPLE LOCATIONS



SAUGUS RIVER MITIGATION SITE

AUGUST 2002

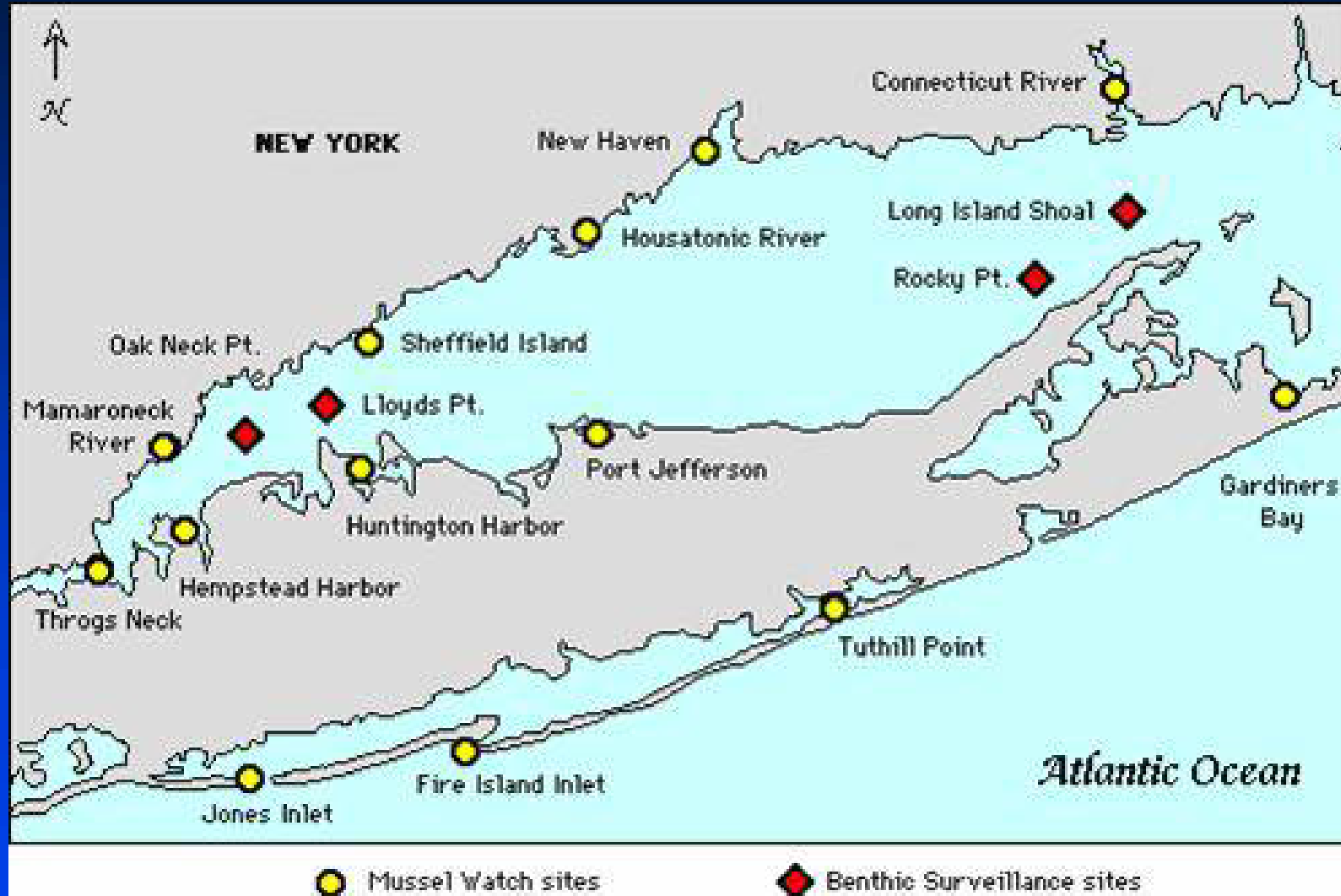


SUMMARY



- **Created intertidal habitat can provide the functions of natural intertidal habitat**
- **Seeding of created intertidal habitats can “jumpstart” clam populations in the created habitat by providing stock for recruitment**

FUTURE SHELLFISH PROJECTS



QUESTIONS?

